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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/537,745	06/06/2005	Chikara Manabe	124136	3561

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EXAMINER	
USELDING, JOHN E	

ART UNIT	PAPER NUMBER
4171	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/537,745	MANABE ET AL.	
	Examiner	Art Unit	
	John Uselding	4171	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *11-20* is/are pending in the application.

4a) Of the above claim(s) *1-10 and 21-34* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *11-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 June 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *8/11/2005*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-10 and 31-33, drawn to a liquid mixture.

Group II, claim(s) 11-20, drawn to a structure.

Group II, claim(s) 21-30 and 34, drawn to a method of forming a structure.

2. Restriction for examination purposes as indicated is proper because the common technical feature of claim 1 is known in the prior art as taught by Fischer et al. (WO 97/32571). Therefore there is not a unity of invention.

3. During a telephone conversation with Joel Armstrong on 6/16/2008 a provisional election was made with traverse to prosecute the invention of Group II, claims 11-20. Affirmation of this election must be made by applicant in replying to this Office action. Claims 1-10 and 21-34 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 11-14 and 16-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Fisher et al. (WO 96/18059)

6. Regarding claim 11: applicant claims a structure made from carbon nanotubes having a functional group and a crosslinking agent capable of prompting a crosslinking reaction with the functional group. The rest of the claim limitations for claims 11 are product by process limitations. Process limitations in product claims are not limited to the manipulations of the recited steps, only the structure implied by the steps. " In re Thorpe , 227 USPQ 964, 966 (Fed. Cir. 1985). Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. *In re Best,* 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada,* 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Therefore, the *prima facie* case can be rebutted by evidence showing that the prior art products do not necessarily possess the characteristics of the claimed product. *In re Best,* 562 F.2d at 1255, 195 USPQ at 433.

See also *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985). Fischer et al. teach structures made from crosslinking carbon fibrils (which are carbon nanotubes, see page 1, lines 3-5) with functional groups using a crosslinking agent , which prompts a crosslinking reaction with the functional group to produce a network of carbon fibrils (page 13, lines 5-15).

7. Regarding claims 12, 16, and 17: applicant claims that the process of making the structure of claim 11 uses a liquid mixture containing a solvent that is also the crosslinking agent. These are all product by process claims. See above for the reason why these limitations do not need to be treated because they provide no additional structural limitations than the limitations already treated in claim 11. The fact that the crosslinking reaction occurs in a liquid mixture with a solvent is not going to change the final structure.

8. Regarding claim 13: applicant claims that the functional groups on the nanotubes comprise –COOR where R is a substituted or unsubstituted hydrocarbon group. Fischer et al. teach nanotubes where the functional groups comprise –COOR' where R` is alkyl, aryl, cycloalkyl, or aralkyl, which are all hydrocarbon groups (page 7, lines 18-35 and claim 1).

9. Regarding claims 14 and 18: applicant claims that the crosslinking agent is a polyol and not-self-polymerizable. Fischer et al. teach that their crosslinking agent can be a polyol (page 13, lines 13-21 and claim 85). Polyols are not-self-polymerizable and thus meet the limitation of claim 18.

10. Claims 11-14 and 16-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Hyperion Catalysis International (WO 97/32571)

11. Regarding claim 11: applicant claims a structure made from carbon nanotubes having a functional group and a crosslinking agent capable of prompting a crosslinking reaction with the functional group. The rest of the claim limitations for claims 11 are product by process limitations. Process limitations in product claims are not limited to the manipulations of the recited steps, only the structure implied by the steps. " In re Thorpe , 227 USPQ 964, 966 (Fed. Cir. 1985). Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. *In re Best*, 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Therefore, the *prima facie* case can be rebutted by evidence showing that the prior art products do not necessarily possess the characteristics of the claimed product. *In re Best,* 562 F.2d at 1255, 195 USPQ at 433. See also *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985). Hyperion teach structures made from crosslinking carbon fibrils (which are carbon nanotubes, see page 1, lines 8-10) with functional groups using a crosslinking agent , which prompts a crosslinking reaction with the functional group to produce a network of carbon fibrils (page 15, lines 20-30).

12. Regarding claims 12, 16, and 17: applicant claims that the process of making the structure of claim 11 uses a liquid mixture containing a solvent that is also the crosslinking agent. These are all product by process claims. See above for the reason why these limitations do not need to be treated because they provide no additional structural limitations than the limitations already treated in claim 11. The fact that the crosslinking reaction occurs in a liquid mixture with a solvent is not going to change the final structure.

13. Regarding claim 13: applicant claims that the functional groups on the nanotubes comprise –COOR where R is a substituted or unsubstituted hydrocarbon group. Hyperion teach nanotubes where the functional groups comprise –COOR' where R` is alkyl, aryl, cycloalkyl, or aralkyl, which are all substituted or unsubstituted hydrocarbon groups (page 8, lines 18-35 and claim 1).

14. Regarding claims 14 and 18: applicant claims that the crosslinking agent is a polyol and not-self-polymerizable. Hyperion teach that their crosslinking agent can be a polyol (page 15, lines 28-36). Polyols are not-self-polymerizable and thus meet the limitation of claim 18.

15. Claims 11-14 and 16-18 are rejected under 35 U.S.C. 102(b) as being anticipated by Niu et al. (WO 02/095098).

16. Regarding claim 11: applicant claims a structure made from carbon nanotubes having a functional group and a crosslinking agent capable of prompting a crosslinking reaction with the functional group. The rest of the claim limitations for claims 11 are

product by process limitations. Process limitations in product claims are not limited to the manipulations of the recited steps, only the structure implied by the steps. " In re Thorpe , 227 USPQ 964, 966 (Fed. Cir. 1985). Where the claimed and prior art products are identical or substantially identical in structure or composition, or are produced by identical or substantially identical processes, a *prima facie* case of either anticipation or obviousness has been established. *In re Best,* 562 F.2d 1252, 1255, 195 USPQ 430, 433 (CCPA 1977). "When the PTO shows a sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not." *In re Spada,* 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990). Therefore, the *prima facie* case can be rebutted by evidence showing that the prior art products do not necessarily possess the characteristics of the claimed product. *In re Best,* 562 F.2d at 1255, 195 USPQ at 433. See also *Titanium Metals Corp. v. Banner*, 778 F.2d 775, 227 USPQ 773 (Fed. Cir. 1985). Niu et al. teach structures made from crosslinking carbon nanotubes with functional groups using a crosslinking agent , which prompts a crosslinking reaction with the functional group to produce a network of carbon nanotubes (page 17, lines 3-11).

17. Regarding claims 12, 16, and 17: applicant claims that the process of making the structure of claim 11 uses a liquid mixture containing a solvent that is also the crosslinking agent. These are all product by process claims. See above for the reason why these limitations do not need to be treated because they provide no additional structural limitations than the limitations already treated in claim 11. The fact that the

crosslinking reaction occurs in a liquid mixture with a solvent is not going to change the final structure.

18. Regarding claim 13: applicant claims that the functional groups on the nanotubes comprise –COOR where R is a substituted or unsubstituted hydrocarbon group. Nui et al. teach nanotubes where the functional groups comprise –COOR' where R` is alkyl, aryl, cycloalkyl, or aralkyl, which are all substituted or unsubstituted hydrocarbon groups (page 7, lines 11-23).

19. Regarding claims 14 and 18: applicant claims that the crosslinking agent is a polyol and not-self-polymerizable. Nui et al. teach that their crosslinking agent can be a polyol (page 17, lines 9-11 and claims 30-31). Polyols are not-self-polymerizable and thus meet the limitation of claim 18.

Claim Rejections - 35 USC § 103

20. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

21. Claims 15, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fisher et al. (WO 96/18059).

22. Applicant claims that the crosslinking agent comprises glycerin and/or ethylene glycol (claim 15). The applicant also claims that the crosslinked sites are connected together with a hydrocarbon skeleton (claim 19) having 2-10 carbon atoms (claim 20).

23. Fisher et al. (claim 82) teach that their crosslinking agent is a diol.

24. Fisher et al. fail to teach where the crosslinking agent is glycerin and/or ethylene glycol. Also they fail to teach that the crosslinked sites are connected together with a hydrocarbon skeleton having 2-10 carbon atoms.

25. Neuhaus et al. teach that ethylene glycol is polyol known in the art that is used as a crosslinking agent (column 3, lines 5-18).

26. Ethylene glycol is a diol and if used as the crosslinking agent with carbon nanotubes functionalized with –COOR (where R is a hydrocarbon group) would provide crosslinked sites that connected together with a hydrocarbon skeleton having 2 carbon atoms as that applicant has shown in figure 13.

27. Since ethylene glycol is known in the art as diol and polyol crosslinking agent it would have been obvious to one of ordinary skill in the art at the time the invention was made to use ethylene glycol as the diol crosslinking agent of Fisher et al. to make crosslinked carbon nanotubes structures.

28. Claims 15, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hyperion Catalysis International (WO 97/32571) in view of Neuhaus et al. (5,028,684).

29. Applicant claims that the crosslinking agent comprises glycerin and/or ethylene glycol (claim 15). The applicant also claims that the crosslinked sites are connected together with a hydrocarbon skeleton (claim 19) having 2-10 carbon atoms (claim 20).

30. Hyperion (page 15, lines 28-36) teach that their crosslinking agent is a polyol.

31. Hyperion fail to teach where the crosslinking agent is glycerin and/or ethylene glycol. Also they fail to teach that the crosslinked sites are connected together with a hydrocarbon skeleton having 2-10 carbon atoms.

32. Neuhaus et al. teach that ethylene glycol is polyol known in the art that is used as a crosslinking agent (column 3, lines 5-18).

33. Ethylene glycol is a diol and if used as the crosslinking agent with carbon nanotubes functionalized with –COOR (where R is a hydrocarbon group) would provide crosslinked sites that connected together with a hydrocarbon skeleton having 2 carbon atoms as that applicant has shown in figure 13.

34. Since ethylene glycol is known in the art as diol and polyol crosslinking agent it would have been obvious to one of ordinary skill in the art at the time the invention was made to use ethylene glycol as the polyol crosslinking agent of Hyperion to make crosslinked carbon nanotubes structures.

35. Claims 15, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Niu et al. (WO 02/095098) in view of Neuhaus et al. (5,028,684).

36. Applicant claims that the crosslinking agent comprises glycerin and/or ethylene glycol (claim 15). The applicant also claims that the crosslinked sites are connected together with a hydrocarbon skeleton (claim 19) having 2-10 carbon atoms (claim 20).

37. Niu et al. (page 17, line 10 and claim 31) teach that their crosslinking agent is a diol.

38. Niu et al. fail to teach where the crosslinking agent is glycerin and/or ethylene glycol. Also they fail to teach that the crosslinked sites are connected together with a hydrocarbon skeleton having 2-10 carbon atoms.

39. Neuhaus et al. teach that ethylene glycol is polyol known in the art that is used as a crosslinking agent (column 3, lines 5-18).

40. Ethylene glycol is a diol and if used as the crosslinking agent with carbon nanotubes functionalized with –COOR (where R is a hydrocarbon group) would provide crosslinked sites that connected together with a hydrocarbon skeleton having 2 carbon atoms as that applicant has shown in figure 13.

41. Since ethylene glycol is known in the art as diol and polyol crosslinking agent it would have been obvious to one of ordinary skill in the art at the time the invention was made to use ethylene glycol as the diol crosslinking agent of Niu et al. to make crosslinked carbon nanotubes structures.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Uselding whose telephone number is (571)270-5463. The examiner can normally be reached on Monday-Thursday 6:00a.m. to 4:30p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on 571-272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/
Supervisory Patent Examiner, Art Unit 4171

John Uselding
Examiner
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/JEU/